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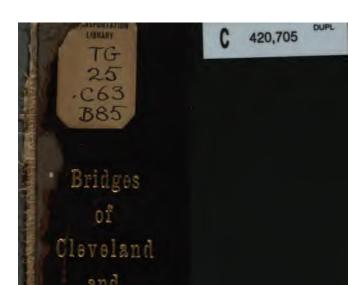
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Cuyahoga

County

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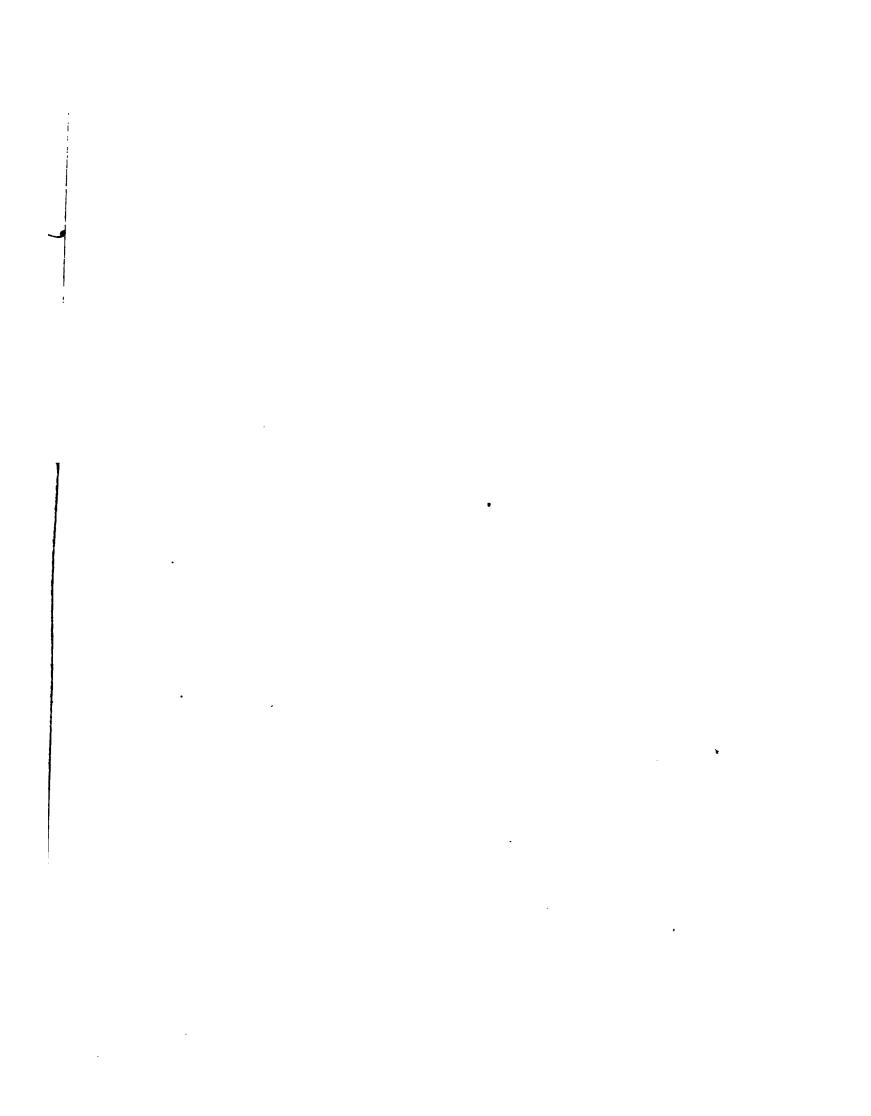
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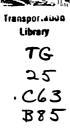
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Land day



FOREWORD



published October 15, 1918, has been prepared by a general committee appointed by Henry W. S. Wood, general chairman of the committee in charge of the exercises coincident with the formal dedication of the new Detroit-Superior

high level bridge.

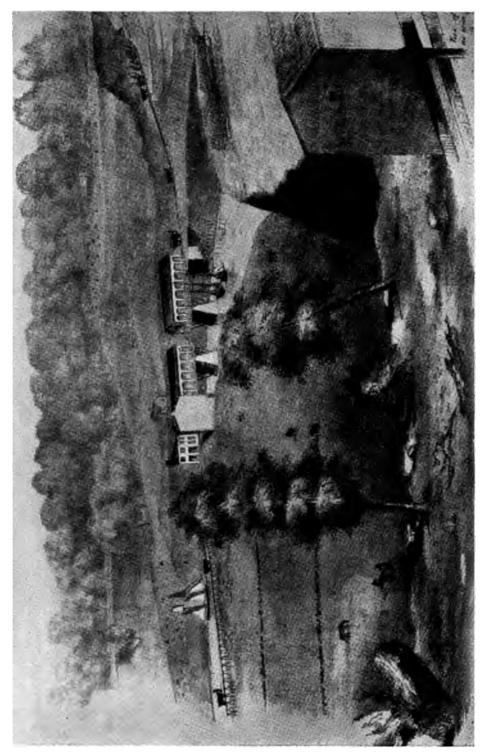
The publication committee consists of Stanley L. McMichael, secretary of The Cleveland Real Estate Board, chairman; Robert Hoffman, city engineer; A. E. Hyre, secretary of The Cleveland Chamber of Industry; W. A. Stinchcomb, county engineer; Edward A. Roberts, secretary of The Cleveland Builders Exchange, and Frank R. Lander, engineer.

Two thousand copies of the book have been issued, of which this is

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Copyrighted by Stanley L. McMichael Oct. 15, 1918

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Residents of Cleveland and Ohio City in 1836 had bloody warfare over this covered wooden structure. This picture was drawn while workmen were grading the Columbus Street hill to the west side, depositing the dirt on the east side of the River THE ORIGINAL COLUMBUS STREET BRIDGE FROM DETROIT AVENUE

THE NEW DETROIT-SUPERIOR HIGH LEVEL BRIDGE

By Stanley L. McMichael



INKING the east and west sides of Cleveland with a broad ribbon of concrete and steel, the new Detroit-Superior high level viaduct, completed during the year 1918, stands as a splendid monument to the enterprise and aggressive action of the citizens of Cuyahoga County. Nowhere in America does there exist at the present day any bridge or viaduct that can rival, in artistic

design, usefulness and permanency of construction, this massive span which binds together the two most populous sections of the metropolis of the middle west.

Successfully completed, after years of agitation, study and diligent effort, the new viaduct is regarded as one of the finest specimens of engineering art to be found anywhere in America. It is the largest double deck reinforced concrete bridge in the world.

Unusual technical difficulties have been overcome, large sums of money have been expended, and now at the time of its formal dedication, it stands a structure that promises to endure for generations to come.

No expense has been spared, nothing has been left undone to make it worthy of the purpose for which it was built. Officials of the city of Cleveland and Cuyahoga County have worked faithfully to bring this great structure into being. The most modern methods have been followed and the result after five years of labor is a structure of pleasing and harmonious design, the beauty and utility of which is apparent to everyone.

The general route followed has been in use as a highway east and west for a century and a quarter, harking back to the closing years of the eighteenth century when locations at both ends of the viaduct comprised the camping grounds of Indians.

It passes the spot where Cleveland's first bridge was constructed and is now the principal gateway from the populous downtown business dis-

Seven

trict, to the great residential sections lying west of the Cuyahoga River, crossing the busy valley wherein are located some of the city's largest industrial plants.

The high level bridge, extending from the center line of West 9th Street to the intersection of West 25th Street and Detroit Avenue, is 3,112 feet long. The actual cost of the big bridge, including the land purchased as a right of way, was \$5,407,000, of which \$1,687,200 was for land and \$3,719,800 for superstructure.

It embraces twelve huge concrete arches and one steel span 591 feet long which bridges the Cuyahoga River and which alone cost \$646,747.



CENTRAL STEEL SPAN IN THE NEW BRIDGE It is 591 feet long and cost \$646,747

The maximum height of the central span above the river is 196 feet and the minimum clearance for lake vessels is 96 feet. The main upper deck is 75 feet wide, permitting two 15-foot sidewalks and a 45-foot roadway. Provision is made on a deck constructed directly beneath the roadway for six street car tracks. Four sets of these tracks have been installed and there is room for two more to be added when needed.

About 2,123,300 cubic yards of concrete and 9,385,000 pounds of reinforcing steel were utilized in its construction. The concrete piles used in the foundation work, if placed end to end, would extend a distance of twenty-eight miles. Each end of the huge structure is provided with underEight

ground street car stations for the use of passengers desiring to board the cars operating on the lower deck.

The bridge was built by Cuyahoga County, of which Cleveland is the county seat. Under a court decision rendered several years ago, the county was authorized to expend money within the city limits on through market roads. As Superior and Detroit Avenues are both county thoroughfares, it was deemed fitting that a great bridge might be built at county expense for the purpose of joining these two important highways. The city of Cleveland co-operated in the removal of underground pipe and wire obstructions and the re-routing of street car traffic.

Original plans did not contemplate the construction of subway entrances, but after the bridge was gotten under way, it was determined that subways would add greatly to its value and eliminate traffic congestion at both ends. Provision was thereupon made to construct a four-track subway, entering the lower level at West 6th Street and two double-track subways at the westerly end, one rising to the surface on West 25th Street near Church Avenue and the other emerging on Detroit Avenue near West 29th Street.

In constructing the bridge, it was necessary to build twelve concrete

arches in clear span width from 58 to 174 feet. All except one are of the same general type. The arches consist of four ribs, each reinforced at points where possible tension may occur. The arch spanning the tracks of the Big Four and Erie Railways had to be of a different construction because the clearance required over the tracks did not permit the use of arch centering. Accordingly, three hinged steel arches of



STREET CAR TRACK ON LOWER DECK

a greater rise, the lower deck being carried through, were used to carry the weight of the concrete while it was poured around these steel arches.

Nine

The west abutment and piers Nos. 5 to 11 inclusive, rest on precast reinforced concrete piles varying in length from twenty-five to fifty feet. These piles, under test, were required to carry a load of sixty tons for seven days, with a maximum allowed settlement of one-quarter of an inch.

Piers Nos. 1 and 2 were carried down from 35 to 40 feet into the natural stratum of clay, bringing the footings of the piers 60 to 65 feet below the surface grade of the ground. These piers are of caisson type built in crib form, of reinforced concrete.

The superstructure east of the river was erected with the aid of a double cableway, having a span between towers of 1,200 feet. The steel head

tower was 180 feet high and the main cables two and a half inches in diameter. The cableway had an ordinary carrying capacity of eight tons, but handled as high as twelve and a half tons in emergencies.

A complete saw mill plant and framing yard was maintained to build forms,

MIDIMONE



LOOKING THROUGH STEEL ARCH

the material being carried to place by the cableways.

The most striking feature of the big bridge, perhaps, is the huge steel span in its center, consisting of a 591-foot steel arch. It is a double decked, three hinged arch, and, like the approaches, carries the roadway and two 15-foot sidewalks on the upper deck, and six street car tracks on the lower level.

The arch is designed to carry a load of 10,000 pounds per lineal foot of bridge plus impact varying for different positions. The span trusses are of nickel steel, other parts being of carbon steel. The steel arch has a rise of 144 feet, a depth at the crown of twenty feet and a depth at the end hangers of ninety-one feet.

The massive arch was erected from each river pier as a cantilever, anchored through back stays to the main concrete piers. The erection of Ten

each arm was started from ninety-foot steel towers erected just back of the abutment piers, the traveler and its two stiff-legged derricks being sustained by these towers.

Engineers had computed that when the trusses were finally placed and before being lowered to take bearing on the center pin the bearing faces would be about twenty inches apart. When the last section in the trusses had been placed the two halves lined up within one-eighth of an inch, which difference was easily adjusted by means of a cable. They were within twenty-two inches of bearing when lowering operations began. It was fascinating to watch the two great trusses, each 290 feet long and weighing about 2,000 tons, slowly settle into position. No movement could be seen, but the space between the two ends gradually lessened until they touched, and the arch took its position. Final adjustment varied but two inches with the computations, in a total span of 591 feet! The marvelous manner in which they proved out was a subject of favorable comment by many eminent engineers who watched the progress of the construction of the arch.

The total weight of steel in the central span is 8,500,000 pounds. There were 195,000 pounds of rivets used in the field joints and 45,000 pounds of paint were required to cover the big arch.

Following the completion of the reinforced concrete arches in the approaches and of the main central arch, earth fills were made between walls at each end of the bridge, the decks were carefully waterproofed and pavements were laid. Balustrades of limestone followed and, finally attractive ornamental lamps were set in place. The bridge is probably one of the best illuminated of any similar structure in America.

The approaches at each end of the bridge flare slightly, giving it an unusually broad and open appearance as one approaches. There is an air of permanency and solidity about the entire structure that is satisfying and one appreciates the fact that aesthetic design has not been sacrificed to mere utility.

While a number of Cleveland organizations and individuals heartily co-operated in the movement to build the new structure particular credit must nevertheless be given to the officers and members of The Cleveland Chamber of Industry, who worked untiringly for the passage of the bond issue which made the big bridge a possibility, and who enthusiastically supported in every way its construction and ultimate completion.

Eleven





THE NEW DETROIT



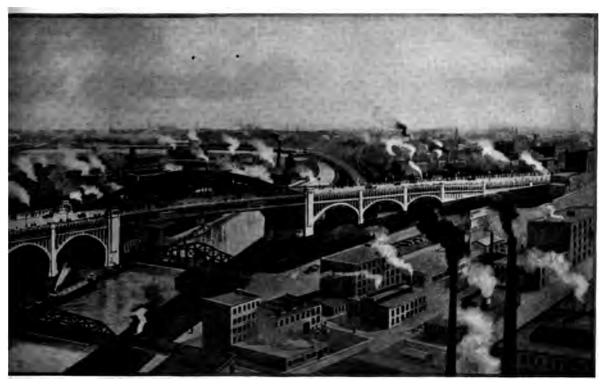
ENDS OF STEEL ARCH ABOUT TO BE JOINED

Twelve

SIZE

Total length . 3,112 feet
Length of arch 591 feet
River clearance 96 feet
Weight
of arch 8,500,000 lbs.
Width of deck . 75 feet





IGH LEVEL VIADUCT

COST

Bridge . . \$2,730,000

Span alone . 646,797

Approaches . 989,900

Land . . . 1,687,200

Total cost . \$5,407,000



SUBWAY APPROACH FROM DETROIT AVENUE

Thirteen





THE OLD DETROIT-SUPERIOR **VIADUCT**

By Henry W. S. Wood

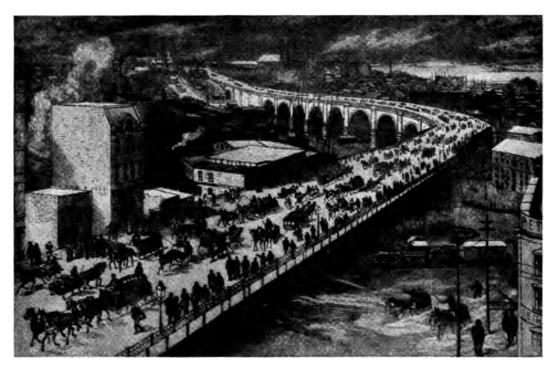
EMPESTUOUS proceedings marked the birth of the old Superior-Detroit viaduct, which was opened to the public on

December 28, 1878, after nearly a decade of bickering, injunction suits and futile efforts to block the improvement. The ease and equanimity with which the new Superior-Detroit high level bridge came into being was in marked contrast with the bitter warfare which lasted for years before the old viaduct was finally completed.

In 1836, Cleveland became a city by the granting of a charter from the legislature. Settlers west of the Cuyahoga River had formed another community and incorporated it under the name of the City of Ohio, more commonly called Ohio City. It was formerly Brooklyn Village.

The crossings of the Cuyahoga River in the earlier days were made over bridges of crude construction, the earliest settlers crossing by means of ferries. Some old pioneers still well remember those early days. Then came a stringer bridge spanning the river, with a rope to steady the person making the passage.

Finally between the present Center Street bridge and the old ferry landing which was at a point about opposite Superior Avenue, there was constructed a float bridge of large whitewood logs chained together. One spring there came a great flood and this float bridge was carried out into the lake. It was succeeded by a pontoon structure made of flat boats chained together. Another flood several years later also carried it into the lake. It was followed by a wooden structure which in due time shared the same fate. Fourteen



THE OLD DETROIT-SUPERIOR VIADUCT

From a picture published in 1878, in Frank Leslie's Weekly. The bridge was referred to as being one of the finest in existence

A new bridge being an imperative necessity, efforts were made to have the two cities agree upon a plan of equally dividing the cost of construction between them. In 1836 a style of bridge was decided upon, the job let, and the structure was nearly completed. James S. Clark and John W. Willey at that time owned large tracts of land in what was then called Willeyville, located in the flats south of Columbus Street. They also owned considerable land on the north side of Columbus Street and were the men responsible for the construction of the original Columbus Street bridge. They boldly conceived the plan of endeavoring to divert traffic from Wooster and other points south across the Columbus Street bridge to the detriment of business men located in Ohio City. A part of their plan was to prevent the reconstruction of the Center Street bridge, so they secured a temporary injunction in the courts and for some time work was suspended.

Residents of the west side were entirely willing to have the Columbus Street bridge in operation but they also wanted one at Center Street and



there came into being at that time the famous slogan, "Two bridges or none."

The court injunction, standing in full power upon the Center Street bridge, made its completion impossible, so attention was directed to the matter of carrying out the threat of doing away with the Columbus Street bridge. The council of Ohio City passed an ordinance on May 26, 1836, ordering the cutting away of the south draw of the old Columbus Street bridge and on the night of May 27, 1836, the Ohio City marshal cut the hinges of the bridge and the south half fell into the river.

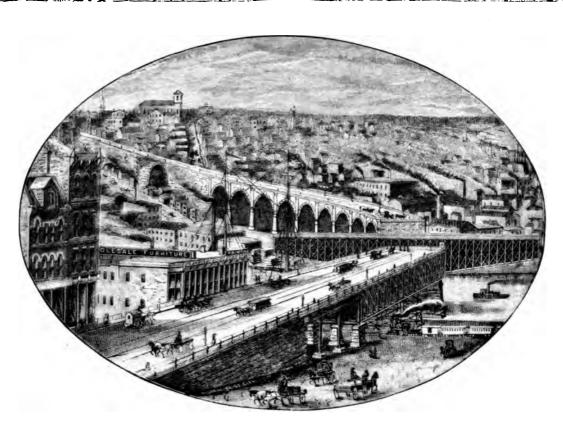
There then took place what is unique in early Cleveland annals—the famous "bridge war," lasting during the month of June of that year. There were no casualties, eight were slightly wounded and a few rioters were taken to jail, but were soon bailed out. Their cases never came to trial. The result of the "bridge war" was that the west siders gained their point and two bridges were built, the Center Street bridge being completed after much discussion.

In April, 1870, at an invitation from citizens on the east side of the river, J. F. Holloway was invited to lecture upon the subject, which he did in the East Side High School building, where the Citizens Trust Building now stands on Euclid Avenue near East 9th Street. He gave an elaborate description of plans for a high bridge, together with its estimated cost, and the amount of traffic then prevailing at different points across the Cuyahoga River.

In 1871, the question of a high bridge was revived. It was asserted that without some enabling legislation, the city was without power to undertake the work. R. B. Dennis, a member of the house of representatives, during that year, drew up and introduced into the house, a bill authorizing the work. There was bitter opposition in Cleveland, the bridge opponents utilizing the Cleveland Herald as their organ. They assailed the measure in severest terms. The bill passed the house but failed in the senate.

On April 18, 1871, there was introduced a resolution in the Cleveland city council providing for the appointment of a committee to examine and Sixteen





OLD DRAWING SHOWING THE OLD VIADUCT FROM THE EAST END

report on the best route and plans for improved communication between the two sides of the river. The city council after a long discussion adopted the resolution on May 8, 1871.

During the summer of 1871, surveys were made of routes. One was planned to connect Ohio Street (now Central Avenue) on the east side, with Lorain Street on the west side. At a meeting of the city council on April 18, 1871, a petition was presented, asking that the necessary surveys, plans and estimates be made for a high level bridge "from high bank to high bank" with a double track carriage way, providing also for street car tracks and sidewalks. This petition was signed by M. A. Hanna, John H. Sargent, J. M. Coffinberry, F. W. Pelton and sixty-seven others.

It was argued at a public meeting on the west side held April 22, 1871, that the number of passengers crossing the viaduct per day would be 15,240, and that the number of teams would be 4,671. It was stated, further, that

Seventeen



tolls received from foot passengers, street cars and vehicles at the rate of two cents each would ultimately pay for the investment and create a sinking fund so the viaduct would in all probability cost the city nothing.

At this same meeting, a resolution was passed, approving the bill which had been introduced in the legislature by Mr. Dennis and its immediate passage was urged. The legislature in January, 1872, adopted the Dennis bill, which granted the right to build a viaduct. The Cleveland Herald assailed it with great bitterness.

On January 30, 1872, a resolution was introduced in the city council of Cleveland proposing that railroad tracks be built in connection with the new viaduct. This necessitated a change in the bill. Accordingly a revised bill was drawn and offered as a substitute. There was also introduced a bill to vacate a part of the Ohio Canal in the city of Cleveland. Both of these were strenuously opposed, chiefly by east siders. As an argument in favor of the bridge, it was stated by Judge Coffinberry that Cleveland twenty years before that date contained but 17,000 inhabitants, while in 1872, the population was approximately 100,000, with the city growing very fast. He recalled the time when the Lighthouse Street bridge was built after long litigation and predictions of bankruptcy, of ruinous conditions and dangers to navigation.

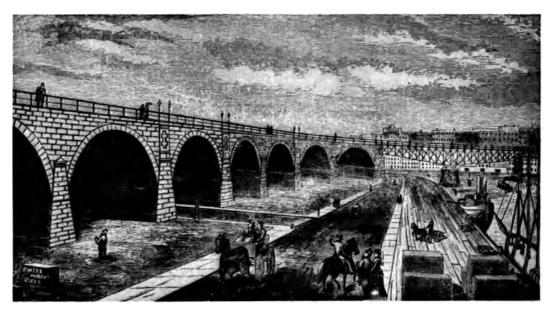
On April 27, 1872, the bill authorizing the construction of the viaduct became a law and two days later, the bill permitting Cleveland to occupy a part of the Ohio Canal site was also adopted.

The question as to whether toll should be collected for vehicles and pedestrians using the viaduct was also included in this bill, permission being given the electors to decide the matter by vote.

Two routes were then proposed, the first from Superior Avenue, where it intersected Water Street, to the intersection of Pearl (West 25th Street) and Franklin Streets. The second route suggested was from the intersection of Superior and Union Streets to the intersection of Pearl (West 25th Street) and Detroit Streets. The second route was recommended by the council and finally approved.

Eighteen





OLD VIADUCT, FROM THE WEST SIDE, FROM A WOOD CUT

On March 30, 1872, the committee recommended that the question be submitted to a vote of the people at the ensuing election in April. This resulted in a vote of 7,548 in favor of the bridge and 2,623 against, making a majority for the project of 4,925. The first estimate of the cost of the stone viaduct was \$759,328.78.

A protest against the construction of the bridge was filed January 28, 1873, being signed by Chas. A. Otis, H. Garretson, W. P. Southworth, Fayette Brown, D. P. Eels, Samuel Williamson and 252 others. They claimed the cost would be excessive and that a bridge to accommodate all the people could be constructed at much less expense. A similar remonstrance was filed February 11 of the same year and was referred to the board of improvements.

On August 19, an ordinance authorizing the issue of bonds to the amount of \$117,893, for land for the viaduct, came before the council. The resolution was lost by a vote of eleven to twelve. The following morning, the Cleveland Leader referred to the occurrence: "Thus the ordinance was consigned to its fate and the viaduct killed."

Citizens of the west side were keenly aroused and held public indignation meetings, sending petitions of remonstrance to the council, signed by more than 4,000 voters.

Nineteen



Despite constant opposition, land was finally purchased October 7, 1873, E. W. Ensign of Buffalo was awarded the contract for the masonry construction for \$512,720, his being the lowest bid.

Initial plans contemplated a viaduct roadway fifty feet wide, but a change was proposed and adopted on March 16, 1875, making it sixty-four feet. The total cost of the project with these changes was \$2,200,000, the cost of the bridge structure alone being about \$1,600,000.

Even after the work was begun and \$500,000 expended, resolutions were presented to the council asking that the entire project be abandoned. The board of improvements, however, reported adversely and the work went on.

On December 21, 1875, the city council asked the legislature to authorize the collection of tolls upon the bridge when completed, tolls not to exceed three cents for a single team and five cents for a double team each way. This money was to go towards the expense of constructing the viaduct. On January 25, 1876, another resolution was presented, asking the legislature to permit toll to be collected "from each passenger and vehicle passing over the bridge, as it may be deemed necessary."

To pay the increased cost of the viaduct, which resulted from the change in plans, the question of voting additional bonds was submitted to the people on May 4, 1876. That the viaduct had its firm friends was indicated by the fact that 6,863 voted in favor of bond issue, while only 3,181 opposed it.

At a meeting held April 18, 1876, H. C. Ford, councilman representing the sixteenth ward, introduced the following resolution which was adopted:

"That as a measure of equalization and relief from immediate burdensome taxation, it is the judgment of this council that for the first twenty Twenty years after the completion of the Superior Street viaduct, a toll shall be required from all traffic passing over the structure."

On December 5, 1876, N. A. Gilbert introduced a resolution calling the attention of the council to the action of the legislature authorizing the city to collect toll. Various ordinances were introduced and referred to committees before action was taken. At no time, however, was toll of any kind ever charged for passing across the viaduct.

During the period from 1870 to the time of the bridge's completion and opening on December 28, 1878, the agitation for and against the viaduct was constantly before the people. There was strong opposition from the east side of the river where claims were repeatedly made that taxes would be excessive due to its cost. Even west siders expressed opposition, maintaining that the completion of the bridge would mean trade would leave the west side and go to east side merchants. Injunctions and objections caused repeated changing of plans. The question of toll was brought in frequently to influence voters to support the bridge although there was evidently little intention on the part of those advocating tolls to make the new structure a toll bridge in any sense.

The viaduct when completed, proved to be an imposing structure consisting of eight arches of 83-foot span, two arches of 97½-foot span, together with retaining walls. The masonry work was 1,382 feet in length and 72 feet in height above the pile foundations, the latter being carried to a depth of twenty feet into a stratum of clay. Pile, timber and concrete grillage was used.

East of the river span the iron work consisted of a continuous plate girder of three 50-foot spans, followed by two 145-foot spans and one 160-foot span. The pivot span crossing the river itself was 332 feet. The total length of the viaduct was 3,211 feet. It rose sixty-eight feet in height above the river.

The old viaduct for forty years served its purpose in building up the city. Now it gives way to the splendid structure which more fully meets the needs of Cleveland's growing industries and expanding population.

Twenty-one



THE EARLY BRIDGES OF CLEVELAND

By Elroy McKendree Avery



HE Cuyahoga valley has a history that is prehistoric. The foundation upon which Cleveland rests is recent as geology reckons eras, but very ancient as written history counts backward her periods of the doings of men. For many years, students have been gathering and interpreting data. Some of their conclusions are that some of the later geologic epochs of our world history

were marked by movements of the earth's crust, grossly comparable to the progressive wrinkling of a pickled orange, and by concomitant or consequent changes of climate.

The first of these, the glacial epoch, was characterized by an upward movement of the earth-crust in high latitudes until that part of the continent was lifted several thousand feet above its present height. On the plateaus thus elevated, snow fell and was easily compacted into ice. Under pressure, ice is plastic and acts much as pitch would act under similar circumstances.

Thus the ice-mass of the glacial period was analagous to a river, the current being supplied by the snowfall in far northern regions. This immense



PRESENT COLUMBUS STREET BRIDGE First double swing bridge in the world

Twenty-two





THE CUYAHOGA VALLEY FROM SCRANTON HEIGHTS ABOUT 1860
Showing the second Columbus Street bridge which replaced the original structure,
over which the bridge war was waged

mass of ice, thousands of feet in thickness, moved slowly southward, sweeping away vast forests, tearing off the tops and sides of ledges, mixing the debris with its own mass, and grinding much of it together to form boulder-clay.

Gravel, sand, clay, and boulders picked up or torn off by the ice were thus carried southward and there left as the ice-sheet melted. The granit hard-head boulders that are not uncommon on the surface of this sandstone region of northern Ohio were thus imported from Canada and laid down at our doors. In this way, the drainage of the glaciated region, of which Cuyahoga County is a part, was so changed that the country resembles, on a large scale, a checked and worm-eaten plank which a carpenter has filled with putty.

After the great glacier had thus plastered its debris in a thick layer over this part of the country, the drainage system had to be re-created. In the course of time, a hundred centuries or more, the valleys of the Cuyahoga and of the lesser streams that divide Cleveland into the East Side, the West Side and the South Side, and the numerous ravines that subdivide these

Twenty-three

sections, were cut by running water thus creating an imperative demand for bridges and viaducts. The lower part of the Cuyahoga river flows to the lake along its deep preglacial valley but far above its ancient bed. The borders and the depth of this preglacial valley have been somewhat accurately determined from the records made in drilling wells for water, gas, and oil.

When Moses Cleaveland and some of his party first arrived at the mouth of the river on July 22, 1796, they advanced a little way up its channel and "attempted to land, but in their efforts to do so ran their boat into the marshy growth of wild vegetation which skirted the easterly bank of the river and stranded her." Here Moses, like his ancient namesake, found himself cradled in the bulrushes.

The place where they landed was the end of an old Indian trail, the passage thence to what we call the West Side being generally made by canoe.

In the following year, 1797, Elijah Gunn, who had been the keeper of the stores at Conneaut, came to Cleveland and for years operated a ferry across the river at the foot of Superior Street, the only easy means of getting across the river to Brooklyn.

One of the first bridges across the river was a floating bridge of whitewood logs near where the Center Street bridge now is. When a vessel had to pass, the logs were floated to one side; when the vessel had passed, the logs were drawn back into place by ropes.



THE PRESENT CENTER STREET BRIDGE
At this point Cleveland's first bridge was
constructed

The first suggestion of a fixed bridge that I have found is in a hitherto unpublished subscription list, dated "Cleaveland, Nov. 16th, 1821." This document was found by the late Probate Judge Henry C. White in a desk containing old papers and documents that belonged to his father, Wileman White, who came from Berkshire County in Massachusetts to Cleveland in 1815, and who died in 1841. This document seems to have been the fifth of a series of similar lists, and reads as follows:

Twenty-four





TIMBER BRIDGE CARRYING THE OLD DUMMY LINE OVER KINGSBURY RUN NEAR E. 55TH STREET ABOUT 1865

"We the Subscribers promise to pay Samuel Williamson, Nathan Perry, David Long, and Thos O. Young or order each one severally for hisself and theirselves, the sum by us severally subscribed and which is annexed to our respective name for the purpose of erecting a free Bridge across the Cuyahoga River; at the line between the lands of Leonard Case & Noble H. Merwin. All Cash Subscriptions shall be payable on demand after Said Bridge is finished all work & material Subscription. The work shall be done at any time upon demand after said Bridge is commenced. And all materials shall be furnished after a contract is made for building the Said Bridge on demand & reasonable notice allowing sufficient time to procure the Same. And when the material is not named in the Subscription, the person subscribing shall furnish such materials as he shall be requested to procure. If any Grain be subscribed it shall be delivered at N. H. Merwins Ware House in Cleaveland; or in Brooklyn, at the Ware House of A. Carters unless otherwise agreed upon by the holders of the Subscription. All materials to be delivered on the ground where the Said Bridge is to be erected at the usual Cash price where no price is affixed."

Twenty-five



THE NEW ROCKY RIVER BRIDGE

Its central arch of 280 feet was for years the longest reinforced concrete arch in the world.

One other bridge built from the same plans is one foot longer

This list has thirteen signatures. None of the subscribers promised money; eight promised wheat; four promised work; and the other one did not specify the kind of help that he was to furnish. Judge White's letter, now in the collections of the Western Reserve Historical Society, says that his father "was the builder of the bridge and doubtless took this contract of subscription in part payment."

By 1832, thanks to the persistent efforts of Alfred Kelley, the Ohio Canal was open from Cleveland on the lake to Portsmouth on the Ohio River. The village at the mouth of the Cuyahoga quickly felt the influence of the new traffic, "and, the impression suddenly came into the minds of Clevelanders that their village had been touched by the wand of destiny."

In 1833, James S. Clark and associates laid out Columbus Street to the river through what was then called Cleveland Center. Several years later, they allotted what they called Willeyville, named in honor of the mayor of Cleveland. Through this Willeyville they laid out an extension of Columbus Street to the Wooster and Medina turnpike on the West Side. They then graded their new street down to the river and, in 1835, spent about \$15,000 more to build a bridge to connect the two sections of their Columbus Street properties, thus completing a short route to Cleveland from the south and west and practically side-tracking Brooklyn village which lay nearer the mouth of the river. This was the first substantial bridge across the Cuyahoga.

Twenty-six

The first city directory, printed in 1837, states that the bridge was "supported by a stone abutment on either shore and piers of solid masonry erected in the center of the river. Between the piers, there is a draw sufficient to allow a vessel of forty-nine feet beam to pass through. The length is two hundred feet, the breadth, including the sidewalks, thirty-three feet, and the height of the piers, above the surface of the water, may be estimated at twenty-four feet. The whole, with the exception of the draw, is roofed and enclosed." (See frontispiece.)

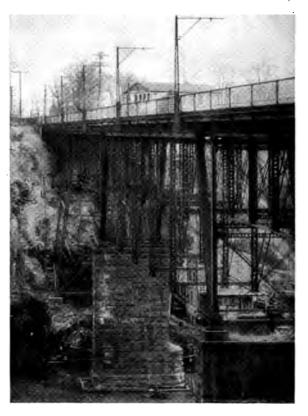
In 1836, the village of Cleveland, which was growing rapidly, was incorporated as the City of Cleveland. The City of Ohio, generally called

Ohio City, was also incorporated. As the inhabitants of Ohio City saw the traffic from Elyria and the intervening farming country pass over the new bridge to their rivals on the east side of the river, trouble ensued between the cities that were sisters and almost twins.

As reported by Colonel Whittlesey, early historian, the rivalry ran so high that a battle occurred on the bridge in 1837.

"A field piece," states Col. Whittlesey, "was posted on the low ground, on the Cleveland side, to rake the bridge, very much as the Austrians did at Lodi, and crowbars, clubs, stones, pistols, and guns were freely used on both sides."

The south draw was cut away, the middle pier and the southern abutment were partly blown down, and the field piece was spiked by the west siders



THE OLD ROCKY RIVER STEEL SPAN

This old steel structure gave way in 1910
to the new concrete bridge

was spiked by the west siders. Some of the actors were confined in the county jail and the bridge question was finally settled by the courts.

Twenty-seven

In addition to Colonel Whittlesey's story of this incident, famous in local history as "The Bridge War," Samuel Orth another historian tells us that at the outset the Cleveland city council had directed the removal of its half of the old float bridge at Center Street. The mandate of the council was obeyed at night, and when the people of Ohio City realized that they were the victims of strategy, they held an indignation meeting and declared the new Columbus Street bridge a public nuisance.

Their marshal organized a possee of deputies and the bridge was damaged by a charge of powder, exploded under the Ohio City end, and thus rendered useless. They were met by the mayor of Cleveland, who was backed by militiamen, his own constituents, with an old field piece that had been used in Fourth of July celebrations. "There was a mixup; planks, stones and fists were freely used. But the old cannon remained silent because benevolent Deacon House, of the west side, had spiked it with an old file."

The fight was stopped by the county sheriff and the Cleveland marshal, and the Cleveland city council, on October 29, 1837, ordered the marshal to keep an armed guard near the bridge. The courts, however, soon put a stop to the petty quarrel.

In ten years the old bridge had grown too small, and in 1846 agitation was begun to build a larger one. The towns could not agree on a plan, Ohio City maintaining that Cleveland owned only to the middle of the river. The county promptly settled the dispute and built the bridge. In 1870, Columbus Street was still one of the leading thoroughfares and an iron bridge was built, which was replaced in 1898 by a new bridge at a cost of \$80,000.

This Columbus Street bridge of 1835 marked the beginning of three distinct periods of bridge building. The first was the period of wooden bridges with masonry abutments and built for wagon traffic. As late as 1853, there were only three of these, one at Columbus Street, another at Seneca (West Third) Street, and the third at Division Street. The second period was of iron and steel structures, fostered if not forced by the advent of the railway. The third or viaduct period, was that in which the valleys, broad and deep, were spanned by high level structures, such as the old and the new Detroit-Superior viaducts.

Twenty-eight



OTHER IMPORTANT BRIDGES IN CLEVELAND

By Stanley L. McMichael



LEVELAND'S unusual topography whereby the city is intersected by numerous valleys and ravines, has made it necessary from the earliest days to build a great many bridges—many more in fact, than the average city possesses. Cleveland, in 1918, has fifty-eight square miles of territory. The total area of Cuyahoga County, including Cleveland, is 463 square miles.

According to the county surveyor's records, there are 105 bridges in Cuyahoga County, exclusive of those that are maintained entirely by the city of Cleveland. Of the 105 county bridges, fifty-three are steel structures, six are of wood, fifteen are of concrete, twelve have concrete arches, and nineteen have stone arches.

In the city of Cleveland, there are eighty bridges, carrying highways. The total length of these eighty bridges is approximately five miles.

The most expensive bridge in Cleveland is the new Detroit-Superior high level bridge, which is costing the county \$5,407,000.

The longest bridge in Cleveland is the Clark Avenue bridge, which has a length over all, including fills, of 6,687 feet, the steel work being 5,992 feet

The shortest bridge in Cleveland or Cuyahoga County is a little structure in the southwestern section of the

public square, which is about fifteen feet long.

The longest steel arch in the county is that in connection with the De-

troit-Superior high level bridge, being 501 feet long.



BRIDGE IN ROCKEFELLER PARK

Twenty-nine





THE HARVARD-DENISON BRIDGE

Erected in 1910, it is 3,232 feet long, being one of the longest bridges in Cleveland. It is

120 feet longer than the new Detroit-Superior high level bridge

The longest concrete arch is that of the Rocky River span, which is 280 feet long.

In addition to the eighty bridges in Cleveland referred to above, carrying highways, there are thirty-seven bridges in the public parks.

It will thus be seen that there are 222 bridges in the parks, city and county, exclusive of railway bridges, of which there are several score.

In the early days, wood was the uniform material used in the construction of bridges. They were heavy, cumbersome structures for the most part, and by no means safe at all times. With the advent of steel and structural iron, new types appeared. Longer spans were provided and efforts at artistic construction were forthcoming.

In the last decade or so, the use of concrete has become quite popular, and most bridges are now constructed of that material, steel being used for reinforcing in every instance.



NICKEL PLATE RAILWAY BRIDGE OVER ROCKY RIVER

A noticeable development of the past few years has been efforts on the part of engineers to produce artistic structures, which, while giving attention to utility, are also of attractive design.

One of the most imposing steel structures in Cleveland is

Thirty





THE NEW BROOKLYN BRIGHTON CONCRETE BRIDGE This structure is 2,365 feet long and has eighteen arches

the Harvard-Denison bridge, erected under the auspices of Cuyahoga County in 1910. The length over all is 3,232 feet, the length between end abutments being 2,781 feet. It contains twenty-two steel deck trusses, the longest span being 153 feet. The width of the bridge is fifty-six feet, consisting of a forty-foot roadway, and two eight-foot sidewalks. The height of roadway above the lowest point is 100 feet. It has two street car tracks. About 17,000 cubic yards of concrete were used. The amount of structural steel was 12,640,000 pounds, and the amount of steel reinforcement was 700,000 pounds. The concrete piles used in its construction, if placed end to end, would extend a distance of one mile. Its total cost was \$527,440. The Harvard-Denison bridge is the largest structure of its kind in the extreme south end of the city, and connects populous business districts in Newburg and Brooklyn.

A bridge which has caused a good deal of favorable comment is the Brooklyn-Brighton concrete bridge, constructed by Cuyahoga County in 1916. It is 2,365 feet long, the distance between end abutments being 1,726 feet. It contains eighteen arches, the longest span of which is 139

feet. The bridge is seventy-six feet wide and the height of the roadway a bove the lowest point is ninety-eight feet. Two street car tracks are provided for. The bridge cost \$571,057, and it was necessary to purchase land worth \$190,798 as a site.



THE OLD STEEL BROOKLYN BRIGHTON BRIDGE Torn down in 1916. Beneath the large arch at the right, may be seen the original bridge at river level.

Thirty-one



NEW TYPE OF COUNTRY BRIDGE

This steel structure spans the Chagrin

River and is 363 feet long

The Rocky River bridge is another large and imposing structure built by the county authorities in 1910. Its total length is 708 feet and the length between end abutments is 586 feet. There are six arches, the main central span being 280 feet long. The bridge is sixty feet wide and the height of the roadway above the lowest point is ninety-four feet six inches. There are two tracks for street

car traffic. The bridge cost Cuyahoga County \$224,850.

Cleveland's longest bridge is the one connecting Clark Avenue across

the Cuyahoga Valley. It was built by the city of Cleveland in 1917, at a cost of \$1,398,000, and has two street car tracks. It is largely of steel construction, 11,173 tons having been used. The total length of the bridge, including intervening fills, is 6,687 feet, the steel work alone being 5,992 feet in length.

One of the earliest bridges in Cleveland was constructed over the river at Seneca Street, now West 3rd Street. The city engineer, in 1857, officially re-



TWIN MASONRY SKEW ARCHES
Formerly carrying the Lake Shore Railway
over Lake Avenue. Every stone was
cut from a different pattern

In 1888, an iron bridge with one

ported that the bridge had collapsed, as it had been overloaded with cattle. A new wooden structure containing a draw operated by hand, replaced it.

pivot span of 180 feet and one fixed span of 105 feet, was built. On June 25, 1903, the city completed another new bridge on the same location, it being a Sherzer roller lift bridge, the first of its kind built by the city. It has a roadway of twenty-three

feet eight inches wide and two 6-foot sidewalks.



OLD TYPE OF COUNTRY BRIDGE
South Rocky River bridge at Lorain
Avenue. It is 1,219 feet long

Thirty-two



The old Main Street bridge was completed July 3, 1869, being 200 feet long and thirty-one feet wide. It was rebuilt and operated by steam in 1885, and again in 1915, it was moved over and longer approaches were built to permit large vessels to enter the river. In 1856, the structure known as the Lighthouse Street bridge, later renamed the Willow Street bridge, was



OLD TYPE STEEL "STRINGER" BRIDGE
This style is practically obsolete. Formerly located
at Irish Road, near Berea

completed. It was replaced by a draw operated by electricity in 1898.

One of the long bridges in Cleveland which is very well known is the Central Viaduct, which was constructed in 1888. Then length of the via-



NEW TYPE OF CONCRETE BRIDGE
This is the kind of bridge the country now builds.
It is over the Chagrin River at Wilson's Mill

duct proper, spanning the Cuyahoga Valley, is 2,839 feet. In 1912, the Central Viaduct was converted into a high level structure by having the central pier removed and the old swing draw replaced with permanent steel bridge work. In conjunction with the Central Viaduct, there was built in 1888 the Abbey Avenue bridge, which is 1,092 feet long.

The Center Street bridge, under the new Detroit-Superior high level

bridge, was the first to be built in Cleveland and has been replaced five or six times, the last occasion being in 1900, when a steel structure was completed at a cost of \$57,000.

The Kingsbury Run viaduct, now known as the East 34th Street bridge, was completed in 1886 at a cost of \$147,580.

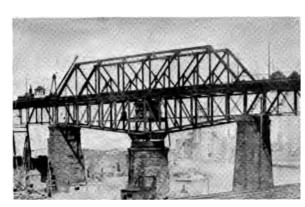


FLATTEST THREE-HINGED CONCRETE BRIDGE

When built, this was the flattest semi-elliptical arch in the world, and the first three-hinged arch built in America

Thirty-three





REPLACING SPANS ON CENTRAL VIADUCT

The span below was removed, the one above replacing
it, converting the structure into a
high level bridge

The Walworth Run bridge was one of the first of the large viaducts built by the city, carrying West 25th Street over the Big Four railway tracks. The present structure was built in 1888, at an approximate cost of \$42,150. In 1911, it was remodeled in connection with the grade crossing work of the Nickel Plate Railway, the southerly end being elevated and extended.

The seven railroads entering Cleveland have built many bridges during the past century,

finding it necessary from time to time to replace them with more modern structures. The Nickel Plate Railway has a large viaduct crossing the Cuyahoga Valley, which will doubtless soon be replaced in connection with reconstruction plans. It also has a large steel span across Rocky River.

When the Cleveland Short Line Railway, popularly known as the "Belt Line," was built about 1910, it was necessary to cross over or under a great many Cleveland streets. Ben F. Hopkins, engineer in charge of the work, states that there are thirty-three bridges, having a total length of 2,683 feet.

When Rockefeller and Gordon Parks were improved many years ago, funds were provided for the construction of large stone bridges to carry Wade Park Avenue, Superior Avenue and St. Clair Avenue across the Parkway. These bridges are of imposing and attractive design, as is also the

heavy stone bridge which carries the Lake Shore Railway over Gordon Park.

The Pennsylvania Railway, in elevating its lines about 1912, spent several millions of dollars in building steel bridges across streets passing under its right of way.

Cleveland is said to possess the largest single track jackknife bridge in the world, being on the B. & O. Railway, where it connects with Whisky Island on Thirty-four



THE OLD MAIN STREET BRIDGE

This same old structure has stood for nearly sixty years.

Cleveland's first three log huts were bnilt within three hundred feet of this spot





the lake front. The B. & O. also has a large jack-knife bridge over the Cuyahoga River, at what was formerly the mouth of the Ohio Canal.

The tendency in recent years has been to build more permanent bridges than here-tofore. The character of the city having been well established by this time, the trends of traffic have been determined, and bridges are being built for the future, it being believed that there is economy in erecting permanent structures. Many millions of dollars have been spent in bridge structures, and many millions more will be spent.



BRIDGING A VALLEY
Railroads entering Cleveland have had to build high bridges to avoid impossible grades

The Cuyahoga Valley imposes great difficulty in the

matter of traffic between the east and west sides. It is already spanned by four great structures, carrying general traffic, i. e., the new Detroit-Superior high level bridge, the Central Viaduct, the Clark Avenue bridge, and the Harvard-Denison bridge.

A bridge which will be replaced with a more permanent structure shortly is that which carries the Lake Shore tracks across the Cuyahoga River at its mouth. When it is finally determined just how the lake front is to be improved, a new and much larger structure will replace the present one, which has stood there for many years.

One more great bridge is already in contemplation, and bonds to the amount of \$5,000,000 have been authorized for its construction. It will cross from the intersection of Ontario Street and Huron Road on the east side, to Lorain Avenue on the west side, and it is planned to make it a counterpart of the new Detroit-Superior bridge, although in all probability it will be longer. It is not contemplated that it will be built until after the war.

Thirty-five





THE BRIDGE THAT WAS BUILT IN A NIGHT

By W. A. Stinchcomb



NIQUE amongst the bridges of Cleveland is one that was constructed in a night over the Lake Shore and Pennsylvania Railroad tracks at the foot of West 6th Street (formerly Bank Street) in connection with a dispute which arose between the city officials of Cleveland and those representing the railroads, as to the right of the city to fill in the lake front and make land oppo-

site Lake View Park.

The dispute came to a head during the closing months of 1896, and the bridge was built between ten o'clock at night and dawn of the following morning, following a meeting of the city council one Monday evening. It was the result of careful maneuvering on the part of Mayor Robert E. McKisson and his aides. Material for the bridge, which was of wood, had been carefully cut and hidden at a convenient point, so that it might be speedily transported to the scene of action.

A corps of engineers was in readiness to superintend the work and sev-

eral large gangs of men from the city's street repair department were held in hiding until the signal was given to get into action. They then swooped down on the railroad tracks at the foot of West 6th Street, erected their timbers and by daylight a completed bridge spanned the tracks and gave access to a small fill of land north of the railway right of way.



THE BRIDGE THAT WAS BUILT IN A NIGHT

Thirty-six

BUILDERS OF THE NEW HIGH LEVEL BRIDGE



ANY men joined hands in the work of planning and completing the new Detroit-Superior high level bridge. Among the county engineers who had to do with the work were A. B. Lea, Frank R. Lander and W. A. Stinchcomb. Their assistants were A. M. Felgate and A. W. Zesiger. Most of the actual work of construction has been supervised by County Engineer W. A. Stinchcomb.

Among the county commissioners who held office during the time the bridge was under way, were Wm. F. Eirick, John G. Fischer, Harry L. Vail, Frank T. Andrews, Joseph Menning, P. D. Metzger and J. T. Kelly.

There were a number of contractors on the big work. The O'Rourke Engineering Co. of New York built the foundations for the two main river piers, their contract calling for an expenditure of \$290,980. The Great Lakes Dredge & Dock Co. of Cleveland placed the foundation for piers for the concrete arches at a cost of \$512,550.

The Hunkin-Conkey Construction Co. of Cleveland had the main contract for the concrete superstructure, calling for an expenditure of \$1,047,-117. The King Bridge Co. of Cleveland built the great steel central span at a cost of \$646,747. Bates & Rogers of Chicago, built the subway approaches at a cost of about \$800,000.

The Trinidad Paving Co. laid the pavements and The Ohio Cut Stone Co. furnished the limestone balustrades. Several other contractors cared for the lighting, heating, plumbing, etc.

City Engineer Robert Hoffman had charge of the arrangements for the removal of pipe and wire obstructions, and otherwise conforming the work to the necessities of local traffic.



Thirty-seven

AN EARLY CLEVELANDER'S VISION WHICH CAME TRUE

TATE OF THE PROPERTY OF THE PR

WAY back in 1835, an editorial appeared in a Cleveland newspaper drawing attention to the necessity of better communication between the east and west sides of Cleveland. In prophetic terms, the writer conceived the idea of constructing a great highway across the Cuyahoga Valley. In connection with the building of a big high level bridge, he submitted the idea of even having

tenements constructed in connection with it, which would face on the road-way thus created.

The dreamer, whose vision in part came true, was Oliver P. Baldwin, city clerk in 1836, who wrote the editorial in The Cleveland Daily Advertiser, just about the time he retired. It was as follows:

· A PROJECT

"On visting Cleveland and Brooklyn a few days since, and surveying the disadvantages which exist in a communication between those two cities, I was naturally led to reflect what great plan could be adopted which the prospects of the place and the condition of the country would warrant to remove all those difficulties, produce harmony between the two and do immortal honor to the whole state, as well as confer a great facility and benefit on every traveler and every inhabitant of our common country.

"That there is an immense amount of travel along the lake, and that that travel is constantly increasing, and will continue to increase, is quite certain; and that some great facilities for traveling on the southern shore of Lake Erie are imperatively called for, is equally certain. The Ohio Railroad, if built and extended to Buffalo with a double track, would, in my opinion, answer this object; and that such a road will be built no person can for one moment doubt. This assurance arises from the fact that it lies in the most natural direction, and almost the only passable route for such a work from the Eastern States to the great and growing West. And it is not a matter of doubt that the Cleveland and Cincinnati Railroad will be built to open a direct communication to that and by another railroad to Charleston, S. C., both of which great thoroughfares must cross the Cuyahoga River Thirty-eight





at or near Cleveland and Brooklyn; and under all these circumstances, together with the local advantages of these points, who can doubt that Cleveland and Ohio City are destined soon to become two great populous, commercial and worthy cities?

"That some communication between these two rival cities of tenfold greater magnitude and convenience than any or all that has been enjoyed, is absolutely necessary, needs no proof.

"The following project is therefore laid before your readers and the whole community. It is to be built by a company chartered for the purpose, or by the State, a grand and stupendous bridge from the top of the hill in Cleveland to the top of the hill in Ohio City, from suitable points in each place, and that it be built of stone with a sufficient number of arches of



WASHINGTON PARK CONCRETE BRIDGE
First bridge in which the city and country joined
in paying constructon cost

the best mason work, supported by stone piers laid deep and strong, either solid or arched width-ways, and that this bridge be 120 feet wide, all of the best stone work, and level on the top for the above railroads, and a common road with sidewalks and iron railings, and that walls of brick or stone be carried up on each side of the bridge with a center or partition wall in the middle, and other partition walls the other way as often as necessary. And that floors be placed in all these apartments as many stories as the whole height of the bridge would allow, and that those rooms on each side, sixty feet deep, and such width as would be convenient, would form the best, most convenient and permanent stores and warehouses that could be conceived of, and the most secure from fire or any other disaster.

Thirty-nine

"The upper stories might be occupied as shops, offices, or even boarding houses, and every apartment made accessible by flights of stairs as well from the top of the bridge as from the ground. This bridge would be high enough to allow any masts or rigging of any vessel that sails the lake to go clear under, so that it would not impede the navigation of the river, and these stores, warehouses, rooms and tenements would rent for a sum sufficient, with what two great railroad companies can well afford to pay, to refund the whole expense of the work in ten years from its completion.

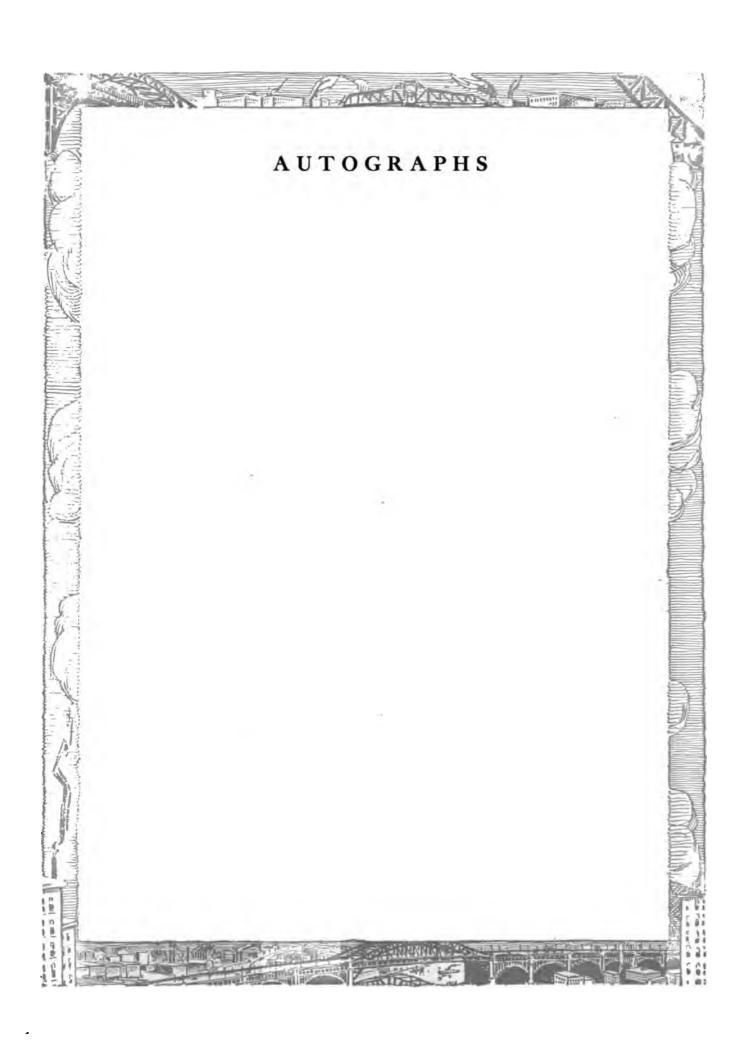
"The street crossing under the bridge would occupy no more room than was necessary for passing conveniently; and even here stores might front on these sheltered streets 120 feet on each side.

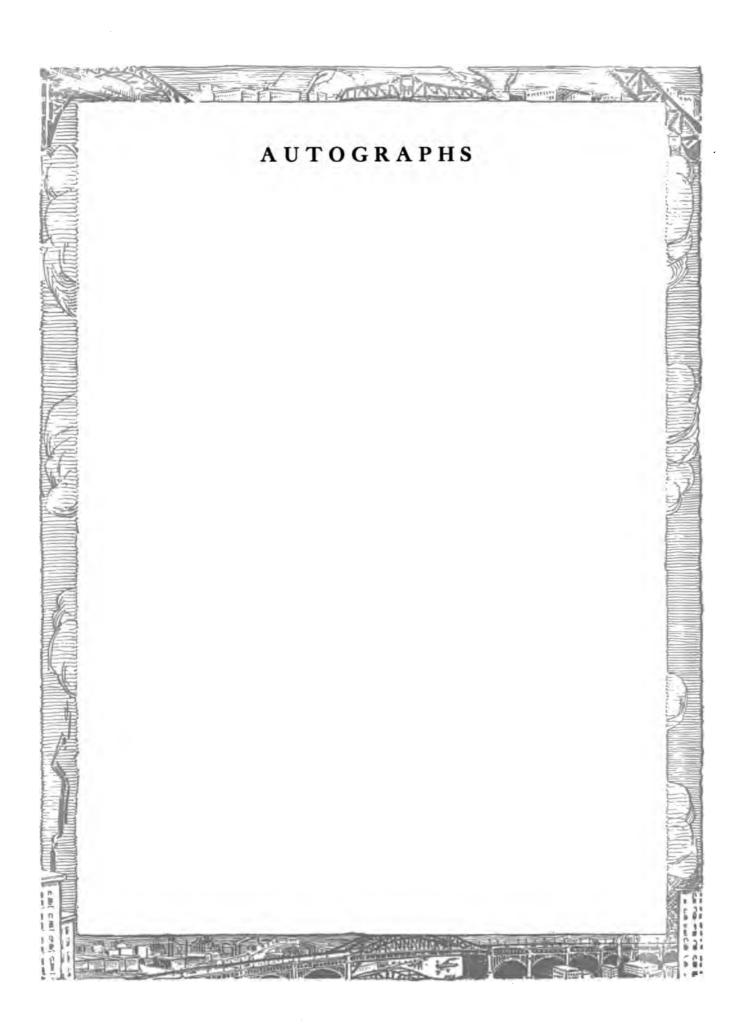
"I have not attempted to give a minute description of the work, nor suggested one-half of the advantages, but have simply laid the subject before my fellow citizens in a plain unvarnished way, and I will only add that such a work is of great importance and absolutely necessary, and would advance the growth, wealth and prosperity of Cleveland and Ohio City more than any work of the same magnitude that can be conceived—would afford the public a convenience which would be of such universal utility and importance as would be surpassed by no other object than necessary food and clothing, and confer immortal honor on the State or the company that built it. One-half of the surplus revenue coming to this state would be sufficient to accomplish the work, and would be a very profitable investment—greatly superior to the canal or any other work hitherto undertaken by the state or any chartered company in it; and it can, must and will be done."

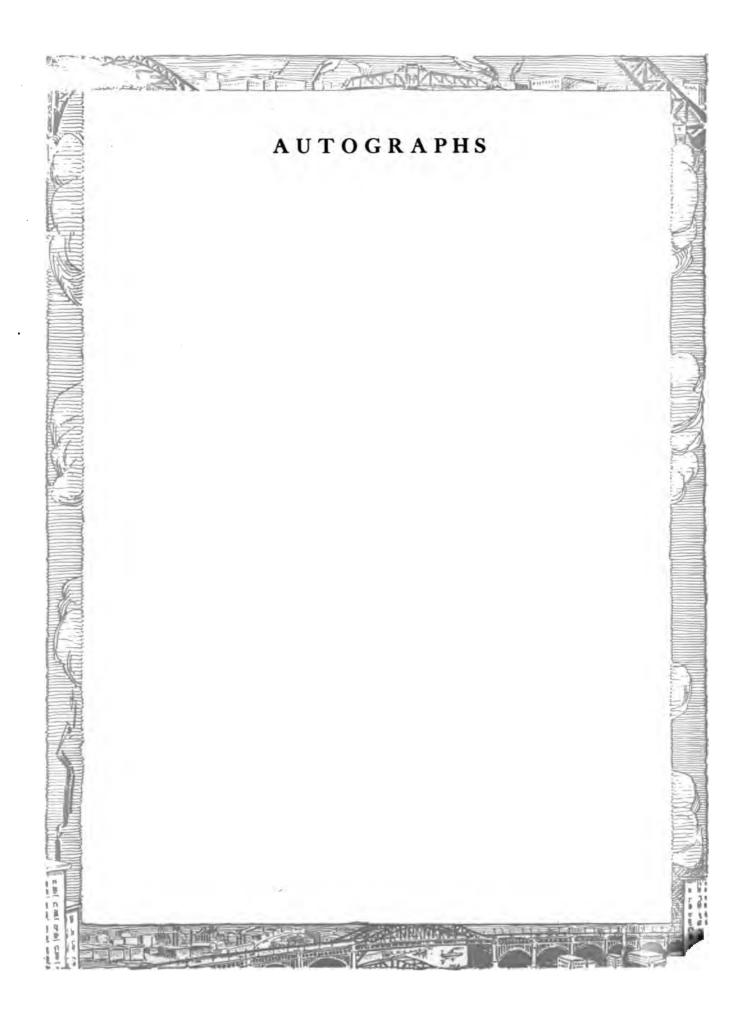
The suggestion was considered merely a wild fancy at the time, which was possible but not probable of execution. What would the author of the editorial think if he could come back today and witness the splendid accomplishments of modern engineering, practice, as exemplified in the new Detroit-Superior high level bridge!



THE OLD AND THE NEW
Old iron bridge and new concrete span over Euclid Creek
at Lake Shore Boulevard









9 986

